

\*\*\*Suspended\*\*\*

Trend Study 5-11-96

Study site name: Mountain Dell Reservoir.

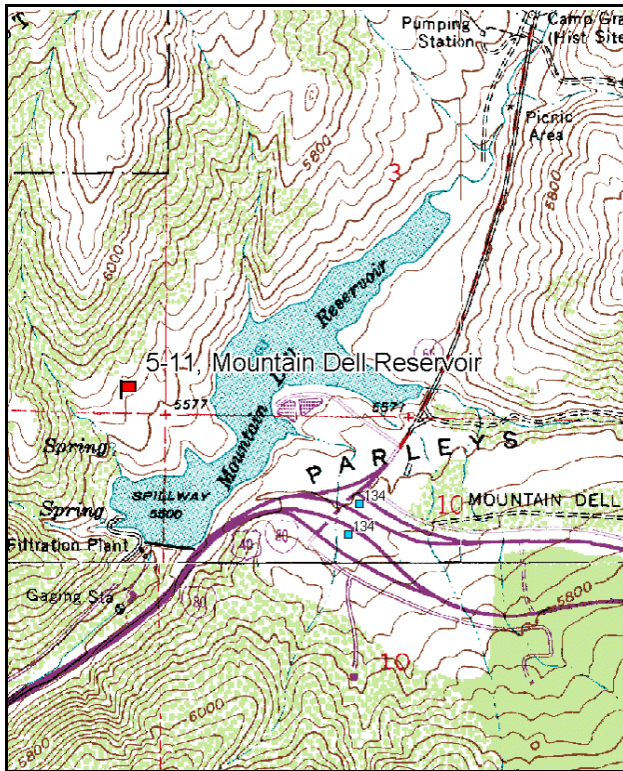
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 130 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

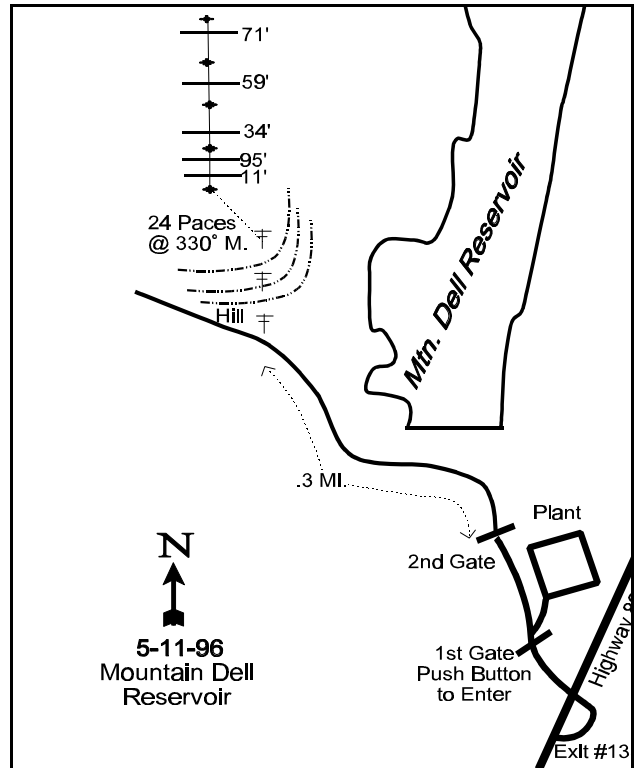
### LOCATION DESCRIPTION

On I-80 heading up Parleys Canyon, take exit 133 to Mountain Dell Dam. You will come to a gate where you will need to push the button to open the gate and drive down to the water purification plant to get a key for the second gate. To get to the site you must obtain permission from Parleys Water Purification Plant (Ph # 583-2186). From the west end of Mountain Dell Dam at the second gate, proceed northwesterly for 0.30 miles to a point where a single aerial telephone line with power poles crosses the road. From this point, walk northerly (i.e., uphill) to the third telephone pole. From the third telephone pole, the 0-foot baseline stake is located 24 paces away on an azimuth of 330 degrees magnetic, towards a large clump-like Hawthorn (*Crataegus*) bush. The 0-foot baseline stake has a red browse tag # 32901 attached.



Map Name: Mountain Dell

Township 15, Range 2E, Section 4



Diagrammatic Sketch

UTM 4511722 N 439040 E

## DISCUSSION

### Trend Study No. 5-11

**\*\*\*SUSPENDED** - This site was suspended in 2001 and will be reevaluated in 2006.

The Mountain Dell Reservoir study site is on a sagebrush/grass slope bordered by Gambel oakbrush located immediately north of Mountain Dell Reservoir. All of Mountain Dell drainage is owned by Salt Lake City and makes up part of the collection system for the city's culinary water. Grazing of domestic livestock is prohibited, as is off-road vehicle use. The study is at an elevation of approximately 5,900 feet on a north-northeasterly aspect with a 10% to 20% slope. Deer use the area primarily as spring-fall range and during mild winters. Elk and moose can also be observed in the area.

Soil is deep and well drained with a clay loam texture. Litter and vegetative cover are excellent, as is organic matter content. No evidence of accelerated erosion is present. Effective rooting depth was estimated at 23 inches with an average temperature of 46° F at 18 inches in depth. Little unprotected bare ground is found on the site and percent bare soil was estimated at only 3% in 1996. Overall soil condition is good to excellent.

Mountain big sagebrush is the key browse species. It accounted for 81% of the total browse cover in 1996. Mountain big sagebrush density was estimated at 2,740 plants/acre in 1996, which is quite similar to the 1990 estimate of 2,599 plants/acre. Percent decadency has declined since 1990, with most plants classified as lightly hedged. The mountain big sagebrush population appears stable. Overall vigor is good. With the increased sample size used in 1996, several other browse species were encountered. Antelope bitterbrush is scattered through the site with an estimated density of 120 plants/acre. Utilization is moderate with good vigor. Oregon grape has an estimated density of 1,480 plants/acre. These plants are small in stature averaging 6 inches in height with a 7 inch crown. Other browse include saskatoon serviceberry, wyeth eriogonum, chokecherry, wood's rose, and blueberry elder. A short distance to the north, bitterbrush is more abundant.

With total exclusion from livestock grazing, grasses and forbs have become very abundant and diverse. Diversity of grasses and forbs is high with more than 56 species sampled on the 5 belts. Grasses are quite diverse, but there are about 5 times more forbs species. Annual forbs and grasses are rare and limited to an occasional hairy brome, a few mustards, and a fair amount of catchweed bedstraw. Utilization of grasses and forbs is uniformly light.

### 1983 APPARENT TREND ASSESSMENT

Soil condition continues to improve. The city's watershed management objectives are probably being met. Vegetative trend is debatable and depends on objectives. The trend seems to be toward an increasing level of grass/forb dominance. Although the data is inconclusive; shrub density, vigor, and reproduction, especially of mountain big sagebrush, seems to be declining in the face of herbaceous competition.

### 1990 TREND ASSESSMENT

The mountain big sagebrush on this lightly used, 5,600 foot elevation winter range is very vigorous and productive. Although the number of mature sagebrush decreased from 1,633 to 1,200 plants/acre, there is abundant reproduction. The population was classified as 57% seedlings in 1990. Sagebrush canopy cover averages 16%. The understory supports a dense and diverse stand of valuable grasses and forbs. Kentucky bluegrass, bluebunch wheatgrass, pacific aster, western yarrow, and showy goldeneye are common species. There is complete ground cover of vegetation and litter, leaving only 1% bare soil.

### TREND ASSESSMENT

soil - stable (3)

browse - up slightly (4)

herbaceous understory - stable (3)

### 1996 TREND ASSESSMENT

Soil trend continues to be stable with abundant vegetative and litter cover. No recent erosion is apparent. Browse trend is slightly upward with a decline in the number of mountain big sagebrush classified as decadent. Other browse species, such as chokecherry and antelope bitterbrush show utilization, but these plants are scattered throughout the site. The understory still supports a dense and diverse herbaceous understory of valuable grasses and forbs. Kentucky bluegrass, cheatgrass, Pacific aster, western yarrow, and showy goldeneye are common species. Herbaceous trend is stable.

### TREND ASSESSMENT

soil - stable (3)

browse - slightly upward (4)

herbaceous understory - stable (3)

### HERBACEOUS TRENDS --

Herd unit 05 , Study no: 11

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'83	'90	'96	'83	'90	'96	'96
G	Agropyron dasystachyum	-	7	-	-	2	-	-
G	Agropyron intermedium	-	-	2	-	-	1	.03
G	Agropyron spicatum	a-	b <sup>93</sup>	a-	-	36	-	-
G	Agropyron trachycaulum	a-	a-	b <sup>37</sup>	-	-	15	2.03
G	Bromus brizaeformis (a)	-	-	3	-	-	1	.03
G	Bromus japonicus (a)	-	-	229	-	-	68	4.84
G	Bromus tectorum (a)	-	-	24	-	-	7	.54
G	Carex spp.	b <sup>46</sup>	a-	a-	21	-	-	-
G	Elymus cinereus	b <sup>24</sup>	a <sup>3</sup>	a <sup>2</sup>	10	3	1	.15
G	Elymus spp.	16	3	-	5	1	-	-
G	Poa pratensis	c <sup>347</sup>	a <sup>230</sup>	b <sup>284</sup>	96	78	80	25.28
G	Unknown grass - perennial	4	-	-	2	-	-	-
Total for Annual Grasses		0	0	256	0	0	76	5.42
Total for Perennial Grasses		437	336	325	134	120	97	27.50
Total for Grasses		437	336	581	134	120	173	32.92
F	Achillea millefolium	b <sup>155</sup>	b <sup>151</sup>	a <sup>50</sup>	51	53	21	.89
F	Agoseris glauca	b <sup>33</sup>	a-	a <sup>1</sup>	14	-	1	.00
F	Alyssum alyssoides (a)	-	-	14	-	-	5	.05
F	Allium spp.	b <sup>24</sup>	b <sup>32</sup>	a <sup>2</sup>	11	14	1	.00

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'83	'90	'96	'83	'90	'96	'96
F	Arabis spp.	-	-	-	-	-	-	.00
F	Artemisia dracunculus	<sub>ab</sub> 8	<sub>b</sub> 16	<sub>a</sub> -	4	5	-	-
F	Artemisia ludoviciana	4	2	-	2	1	-	-
F	Aster chilensis	<sub>b</sub> 177	<sub>b</sub> 161	<sub>a</sub> 84	62	58	34	1.30
F	Astragalus convallarius	1	3	-	1	1	-	-
F	Balsamorhiza macrophylla	<sub>b</sub> 26	<sub>a</sub> 6	<sub>a</sub> 3	10	4	2	.24
F	Brodiaea douglasii	<sub>b</sub> 19	<sub>a</sub> -	<sub>a</sub> -	9	-	-	-
F	Calochortus nuttallii	4	-	-	2	-	-	-
F	Cirsium spp.	-	4	1	-	2	1	.00
F	Collomia linearis (a)	-	-	17	-	-	9	.04
F	Collinsia parviflora (a)	-	-	17	-	-	5	.27
F	Crepis acuminata	-	9	6	-	3	2	.01
F	Cynoglossum officinale	<sub>a</sub> -	<sub>b</sub> 27	<sub>a</sub> 2	-	11	1	.00
F	Epilobium brachycarpum (a)	-	-	49	-	-	20	.33
F	Erigeron spp.	-	-	1	-	-	1	.03
F	Eriogonum spp.	2	-	-	1	-	-	-
F	Eriogonum umbellatum	<sub>b</sub> 35	<sub>b</sub> 26	<sub>a</sub> -	14	10	-	-
F	Galium aparine (a)	<sub>ab</sub> 2	<sub>a</sub> -	<sub>b</sub> 13	1	-	5	.07
F	Geranium spp.	12	7	-	4	2	-	-
F	Hackelia patens	1	-	-	1	-	-	-
F	Helianthella uniflora	<sub>ab</sub> 37	<sub>b</sub> 60	<sub>a</sub> 27	15	26	9	1.68
F	Holosteum umbellatum (a)	-	-	2	-	-	1	.03
F	Lathyrus brachycalyx	<sub>b</sub> 85	<sub>a</sub> 29	<sub>ab</sub> 47	31	15	25	.63
F	Lathyrus pauciflorus	<sub>b</sub> 101	<sub>a</sub> -	<sub>a</sub> -	40	-	-	-
F	Lactuca serriola	<sub>a</sub> -	<sub>b</sub> 39	<sub>b</sub> 42	-	17	22	.29
F	Lithophragma parviflora	<sub>b</sub> 28	<sub>a</sub> -	<sub>a</sub> -	12	-	-	-
F	Lithospermum ruderales	<sub>b</sub> 16	<sub>b</sub> 23	<sub>a</sub> -	7	14	-	-
F	Lupinus sericeus	<sub>b</sub> 43	<sub>b</sub> 29	<sub>a</sub> 12	18	18	5	.72
F	Mertensia brevistyla	<sub>b</sub> 14	<sub>a</sub> -	<sub>a</sub> -	6	-	-	-
F	Microsteris gracilis (a)	-	-	12	-	-	6	.03
F	Polygonum douglasii (a)	-	-	82	-	-	36	.40
F	Rumex spp.	-	2	-	-	1	-	-
F	Senecio integerrimus	4	-	-	3	-	-	-
F	Solidago missouriensis	-	-	7	-	-	2	.30
F	Taraxacum officinale	3	7	3	2	3	1	.03
F	Tragopogon dubius	<sub>a</sub> 17	<sub>b</sub> 58	<sub>c</sub> 106	11	27	54	1.30

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'83	'90	'96	'83	'90	'96	'96
F	Unknown forb-perennial	6	-	-	4	-	-	-
F	Verbascum thapsus	-	-	3	-	-	1	.03
F	Vicia americana	<sub>b</sub> 120	<sub>a</sub> 7	<sub>a</sub> -	52	3	-	-
F	Viguiera multiflora	<sub>a</sub> 20	<sub>b</sub> 74	<sub>a</sub> 18	10	31	8	.11
Total for Annual Forbs		2	0	206	1	0	87	1.23
Total for Perennial Forbs		995	772	415	397	319	191	7.62
Total for Forbs		997	772	621	398	319	278	8.85

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

#### BROWSE TRENDS --

Herd unit 05 , Study no: 11

T y p e	Species	Strip Frequency	Average Cover %
		'96	'96
B	Artemisia tridentata vaseyana	80	15.98
B	Eriogonum heracleoides	8	1.01
B	Mahonia repens	10	.57
B	Prunus virginiana	11	.33
B	Purshia tridentata	4	1.54
B	Rosa woodsii	3	.06
B	Sambucus racemosa	1	.03
B	Symphoricarpos oreophilus	2	.30
Total for Browse		119	19.85

#### BASIC COVER --

Herd unit 05 , Study no: 11

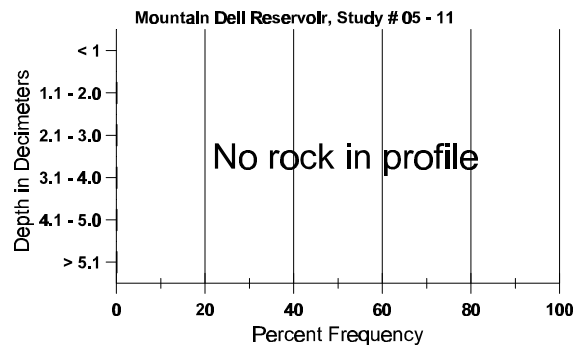
Cover Type	Nested Frequency	Average Cover %		
		'83	'90	'96
Vegetation	394	9.25	13.00	58.34
Rock	8	0	0	.02
Pavement	5	0	0	.01
Litter	400	89.75	86.00	71.09
Cryptogams	-	0	0	0
Bare Ground	109	1.00	1.00	3.40

SOIL ANALYSIS DATA --

Herd Unit 05, Study no: 11, Mountain Dell Reservoir

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
23.4	46.2 (18.1)	6.2	38.2	33.1	28.7	3.5	34.7	297.6	.4

## Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 05 , Study no: 11

Type	Quadrat Frequency '96
Elk	1
Deer	6

BROWSE CHARACTERISTICS --

Herd unit 05 , Study no: 11

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total						
		1	2	3	4									
Amelanchier alnifolia														
M	83	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	0	122	84	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'83		00%		00%		00%								
'90		00%		00%		00%								
'96		00%		00%		00%								
Total Plants/Acre (excluding Dead & Seedlings)										'83	0	Dec:	-	
										'90	0		-	
										'96	0		-	

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	99	-	-	6	-	-	-	-	-	105	-	-	-	3500		105	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	83	6	-	-	-	-	-	-	-	-	6	-	-	-	200		6	
	90	15	-	-	1	-	-	-	-	-	16	-	-	-	533		16	
	96	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	83	25	23	1	-	-	-	-	-	-	43	-	6	-	1633	33	42	49
	90	33	2	-	1	-	-	-	-	-	36	-	-	-	1200	34	44	36
	96	112	4	-	-	-	-	-	-	-	116	-	-	-	2320	27	45	116
D	83	4	1	-	-	-	-	-	-	-	3	-	2	-	166		5	
	90	23	3	-	-	-	-	-	-	-	19	-	-	7	866		26	
	96	13	-	-	-	-	-	-	-	-	13	-	-	-	260		13	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	900		45	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		40%			02%			13%			+23%							
'90		06%			00%			09%			+ 5%							
'96		03%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	1999	Dec:	8%			
												'90	2599		33%			
												'96	2740		9%			
Chrysothamnus viscidiflorus viscidiflorus																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	1	-	-	-	-	-	-	-	-	-	1	-	-	33	15	6	1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	33		-			
												'96	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Eriogonum heracleoides																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	15	-	-	-	-	-	-	-	-	-	15	-	-	-	300	9	33
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	0		-			
												'96	300		-			
Mahonia repens																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	7	-	-	5	-	-	-	-	-	-	12	-	-	-	240		12
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	34	-	-	28	-	-	-	-	-	-	62	-	-	-	1240	6	7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	0		-			
												'96	1480		-			
Prunus virginiana																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	7	-	-	-	-	-	-	-	-	-	6	1	-	-	140		7
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	7	-	-	3	-	-	-	-	-	-	10	-	-	-	200	25	19
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	0		-			
												'96	340		-			



A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	2	4	-	-	-	-	-	-	-	-	6	-	-	-	120	34	66
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		67%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	0		-			
												'96	120		-			
Rosa woodsii																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	4	-	-	1	-	-	-	-	-	-	5	-	-	-	100	18	8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	0		-			
												'96	100		-			
Sambucus racemosa																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	-	1	-	-	-	20	15	13
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	0		-			
												'96	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	1	-	-	-	-	-	-	-	-	-	1	-	-	33		1	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	96	-	-	-	2	-	-	-	-	-	-	2	-	-	40	41	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'90		00%			00%			00%			+18%							
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'90	33		-			
												'96	40		-			